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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/840,545	04/23/2001	Roger S. Tsai	12-1118	4814

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EXAMINER

JONES, HUGH M

ART UNIT

PAPER NUMBER

2128

DATE MAILED: 03/30/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/840,545	TSAI, ROGER S.	
	Examiner	Art Unit	
	Hugh Jones	2128	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 04 January 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☒ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-11 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-11 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of.
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------------------|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. Claims 1-11 of U.S. Application 09/840,545 are pending.

Priority

2. Applicant's claim for the benefit of a prior-filed application under 35 U.S.C. 119(e) or under 35 U.S.C. 120, 121, or 365(c) is acknowledged. Applicant has not complied with one or more conditions for receiving the benefit of an earlier filing date under 35 U.S.C. [1] as follows:

3. The later-filed application must be an application for a patent for an invention which is also disclosed in the prior application (the parent or original nonprovisional application or provisional application). The disclosure of the invention in the parent application and in the later-filed application must be sufficient to comply with the requirements of the first paragraph of 35 U.S.C. 112. See *Transco Products, Inc. v. Performance Contracting, Inc.*, 38 F.3d 551, 32 USPQ2d 1077 (Fed. Cir. 1994).

4. The disclosure of the prior-filed six applications, fails to provide adequate support or enablement in the manner provided by the first paragraph of 35 U.S.C. 112 for one or more claims of this application. Applicant's claimed embodiments do not have written description support in the six provisional applications. The Examiner requests that Applicants point out which claimed embodiments have written description support in which priority documents. It is noted that a claimed embodiment that synthesizes a claimed embodiment from more than one (in this case up to six) different priority

documents lacks written description support. A 1.105 requirement for information is not being made at this time.

Claim Objections

5. Claim 8-11 is objected to under 37 CFR 1.75(c). Claim 1 recites "...to form a dependent semiphysical". It appears that the claims should recite "...to form a dependent semiphysical model". In claims 8-9, 11, it appears that "co-efficient" should be replaced with coefficient.

Claim Rejections - 35 USC § 112

6. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

7. Claims 1-11 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the "semiphysical model" as disclosed on pages 15-17 of the specification, does not reasonably provide enablement for any semiphysical model. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the invention commensurate in scope with these claims.

8. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

9. Claims 1-11 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

- Claim 1: the claim recites "... temperature dependent semiphysical." It appears that it should recite "... temperature dependent semiphysical model".
 - claim 2: determining the charge/electric field structure: While it is true that there is a relationship between the two, the two are different features and requires different calculations. Therefore, the claim is ambiguous.
 - Claim 5: the claim recites "... to replicate said DC I-V and bias dependent." It appears that it should recite "bias dependent small signal characteristics" in order to be unambiguous and further to have antecedent basis in claim 4.
10. Claim 9 recites the limitation "wherein step c...". There is insufficient antecedent basis for this limitation in claim 1. There is no "step c", which has been canceled by amendment. Claim 9 is thus rejected.
11. Claim 10 recites the limitation "the saturated region". There is insufficient antecedent basis for this limitation in claim 1. Claim 1 broadly claims "semiconductor model" and thus includes, for example, base-junction transistors which do not have a saturated region. If Applicants wish to have antecedent basis for such a feature, an FET must be expressly recited in claim 1. Claim 10 is thus rejected.
12. Claims 1-5, 8 are rejected under 35 U.S.C. 112, second paragraph, as being incomplete for omitting essential steps, such omission amounting to a gap between the steps. See MPEP § 2172.01. The omitted steps are:

- Claims 3-5: the steps pertaining to "configured". The meaning is unknown; it appears that there are missing steps.
- Claim 8: "developing temperature co-efficient". The specifics of the model have not been claimed. It is unknown what the co-efficients are related to and how they are developed. It appears that there are missing steps.

13. Note that many 112 rejections and claim objections have been applied against the claims. MPEP section 2173.06 (Prior Art Rejection of Claim Rejected as Indefinite) addresses the issue of applying prior art against such claims:

... Second, where there is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of a claim, it would not be proper to reject such a claim on the basis of prior art. As stated in *In re Steele*, 305 F.2d 859, 134 USPQ 292 (CCPA 1962), a rejection under 35 U.S.C. 103 should not be based on considerable speculation about the meaning of terms employed in a claim or assumptions that must be made as to the scope of the claims. The first approach is recommended from an examination standpoint because it avoids piecemeal examination in the event that the examiner's 35 U.S.C. 112, second paragraph rejection is not affirmed, and may give applicant a better appreciation for relevant prior art if the claims are redrafted to avoid the 35 U.S.C. 112, second paragraph rejection.

14. *There is a great deal of confusion and uncertainty as to the proper interpretation of the limitations of all claims, and thus it would not be proper to reject such a claim on the basis of prior art. However, in the interests of compact prosecution, such an interpretation will be nonetheless provided where possible. Specifically, a prior art rejection is applied against all dependent claims, except for claims 8-9, whose meaning cannot be ascertained, in anticipation that Applicants will rectify the claim deficiencies.*

Claim Rejections - 35 USC § 102

15. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

16. Claims 1-7, 10-11 are rejected under 35 U.S.C. 102(b) as being clear anticipated by Lu et al.. Claims 8-9 have not been examined for reasons provided earlier.

17. Lu et al. disclose :

1. A method for modeling a semiconductor device comprising the steps of:

(a) modeling the semiconductor device with a semiphysical model at a predetermined temperature (abstract; page 1433, col. 2, full paragraph; section III [The Proposed HBT Model] – particularly note subsection A [static part of new HBT model]; section VII [Conclusion]);

(b) incorporating the thermal properties of the material system of the semiconductor device into the semiphysical model to form a temperature dependent semiphysical {*model?*} (abstract; page 1433, col. 2, full paragraph; section III [The Proposed HBT Model] – particularly note subsection A [static part of new HBT model]; section VII [Conclusion] – *particularly note section IV, especially subsections A-B*).

2. The method as recited in claim 1, further including step (d) determining the internal charge/electric field charge of the semiconductor device (eqn. 7 where $I = dQ/dt$; eqn. 15; fig. 5; eqn. 16).

3. The method as recited in claim 1, wherein said semi-physical model is configured to replicate measured direct current (DC) current-voltage (I-V) characteristics (fig. 1-2; eqns. 1-2, 7, particularly fig. 11).
4. The method as recited in claim 3, wherein said semi-physical model is also configured to replicate bias dependent small signal characteristics (abstract; page 1433, col. 2, full paragraph; section III [The Proposed HBT Model] – particularly note subsection A [static part of new HBT model]; section VII [Conclusion] – note fig. 3. Note step 8 on page 1442. Note col. 1-2, page 1443 and fig. 12; col. 1, page 1444).
5. the method as recited in claim 4, wherein said semi-physical model is configured to replicate said DC I-V and bias dependent (abstract; page 1433, col. 2, full paragraph; section III [The Proposed HBT Model] – particularly note subsection A [static part of new HBT model]; section VII [Conclusion] – note fig. 3).
6. The method as recited in claim 1, wherein step (b) includes the step (e): measuring the DC-IV characteristics and the S-parameter small signal parameters across a predetermined range of temperatures (fig. 12; section IIIA; col. 1-2, page 1439; col. 1-2, page 1443; col. 1, page 1444).
7. The method as recited in claim 6, further including the step (f): extracting small signal equivalent circuit models for each S-parameter measurement as a function of temperature (fig. 12; section IIIA; col. 1-2, page 1439; col. 1-2, page 1443; col. 1, page 1444).

8. The method as recited in claim 7, further including step (g): developing temperature co-efficient (s?) which adjust the semi-physical device model to match the measured DC and S-parameter measurements at each temperature (*not examined*).

9. The method as recited in claim 1, wherein step (c) includes the step (h): substituting the environment temperature that operates in any temperature dependent terms and temperature co-efficient with the channel temperature of the device (*not examined*).

10. The method as recited in claim 1, further the (?) step of using of the saturated region as the length of the heat generating region (no antecedent basis in this case where the applied art is for a bipolar transistor (which is a semiconductor device). Therefore this recitation does not further limit the intervening claim).

11. The method as recited in Claim 1, wherein step (b) comprises: developing temperature co-efficient expression and adjusting the predictions of the semiphysical model to match the measured DC and small signal data at a plurality of temperatures. (abstract; page 1433, col. 2, full paragraph; section III [The Proposed HBT Model] – particularly note subsection A [static part of new HBT model]; section VII [Conclusion]).

Response to Arguments

3. Applicant's arguments, filed 1/4/2006 and 10/10/2005, have been carefully considered, but are not persuasive.

The objection recited in the action of 11/2/2004 is withdrawn based upon the amendment. However, note the new objection.

Applicant's arguments pertaining to the 112 scope of enablement rejection are noted but are not persuasive. For example, while the claims recite "semiconductor device", and while Applicants argue for a semiphysical model for semiconductors, which include base-junction transistors and other devices besides FETs, there is no teaching of a semiphysical model for base-junction transistors or the other devices. Furthermore, there are many phenomena associated with FETs including reverse short channel effects, for example, which are not addressed by the application.

Please note the art rejections applied against the amended claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be:

directed to: Dr. Hugh Jones telephone number (571) 272-3781,
Monday-Thursday 0830 to 0700 ET,

or

the examiner's supervisor, Kamini Shah, telephone number (571) 272-2279.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist, telephone number (703) 305-3900.

mailed to:

Commissioner of Patents and Trademarks
Washington, D.C. 20231

or faxed to:

(703) 308-9051 (for formal communications intended for entry)

or (703) 308-1396 (for informal or draft communications, please label *PROPOSED* or *DRAFT*).

Dr. Hugh Jones
Primary Patent Examiner
March 23, 2006

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